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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,938	10/09/2003	Robert Nilson	SD-8479	3878

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EXAMINER

MCKINNON, TERRELL L

ART UNIT PAPER NUMBER

3743

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

### Application No.

10/683,938

### Applicant(s)

NILSON ET AL.

### Examiner

Terrell L Mckinnon

### Art Unit

3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 0203.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-9, 13, 16, 20-24, 29, 30, 34 and 37 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 10-12, 14, 15, 17-19, 25-28, 31-33, 35, 36 and 38-40 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Mundinger et al. (U.S. 5,453,641).

Mundinger discloses a cooling device comprising all of the applicant's claimed and disclosed limitations of the instant invention.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 6, 7, 23, 24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mundinger et al. (U.S. 5,453,641) in view of Nelson et al. (U.S. 4,953,634).

Mundinger's invention discloses all of the claimed limitations from above except for maintaining a gradient in the capillary pressure difference comprises varying the

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cross section of the channel in the flow direction; maintaining a gradient in the capillary pressure difference further comprises reducing a width of each of the one or more channels between the first and second ends; reducing a width of each of the one or more channels comprises continuously tapering a cross section of said channels in the flow direction; and the width is reduced by up to about 70% between the first and second ends.

5. However, Nelson teaches varying the cross section of a channel in the flow direction (Fig. 6); reducing a width of each of the one or more channels between the first and second ends; reducing a width of each of the one or more channels comprises continuously tapering a cross section of the channels in the flow direction (Fig. 6); and the width is reduced by up to about 70% between the first and second ends.

Given the teachings of Nelson, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling system of Mundinger with maintaining a gradient in the capillary pressure difference comprises varying the cross section of the channel in the flow direction; maintaining a gradient in the capillary pressure difference further comprises reducing a width of each of the one or more channels between the first and second ends; reducing a width of each of the one or more channels comprises continuously tapering a cross section of said channels in the flow direction; and the width is reduced by up to about 70% between the first and second ends.

Doing so would provide a means of maintaining the pressure gradient of the cooling liquid and provide a means of increasing the surface area of the cooling

channels to enhance the cooling performance.

6. Claims 8, 9, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mundinger et al. (U.S. 5,453,641) in view of Nelson et al. (U.S. 4,953,634) as applied to claims above, and further in view of Frey et al. (U.S. 5,978,220).

Mundinger's invention, as modified by Nelson, discloses all of the claimed limitations from above except for maintaining the gradient comprises an array of post-like features disposed in the one or more channels; the post-like features comprise a cross-sectional shape selected from the list consisting of circles, ellipses, rectangles or polygons, and a height about equal to a depth of the one or more channels.

7. However, Frey teaches an array of post-like features (11) disposed in the one or more channels; the post-like features comprise a cross-sectional shape selected from the list consisting of circles and a height about equal to a depth of the one or more channels.

Given the teachings of Frey, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the cooling device of Mundinger with maintaining the gradient comprises an array of post-like features disposed in the one or more channels; the post-like features comprise a cross-sectional shape selected from the list consisting of circles and a height about equal to a depth of the one or more channels.

Doing so would provide a means of enhancing heat conductivity through the cooling device.

8. Claims 13, 16, 34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mundinger et al. (U.S. 5,453,641) in view of Nelson et al. (U.S. 4,953,634) as applied to claims above, and further in view of Pease et al. (U.S. 4,567,505).

Mundinger's invention, as modified by Nelson, discloses all of the claimed limitations from above except for a cover plate having one or more openings comprising an interior wall, wherein the cover plate covers the channel and a meniscus forms at the interior wall within each on or more openings; the openings comprise a plurality of shapes selected from the list consisting of circles, ellipses, rectangles or polygons.

9. However, Pease teaches a cover plate (10) having one or more openings comprising an interior wall, wherein the cover plate covers the channel and a meniscus forms at the interior wall within each on or more openings; the openings comprise a plurality of shapes selected from the list consisting of rectangles.

Given the teachings of Pease, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the cooling device of Mundinger with a cover plate having one or more openings comprising an interior wall, wherein the cover plate covers the channel and a meniscus forms at the interior wall within each on or more openings; the openings comprise a plurality of shapes selected from the list consisting of rectangles.

Doing so would provide a thermally conductive cover for securing the conductive liquid for heat transfer from heat generating devices attached.

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***Allowable Subject Matter***

10. Claims 4, 5, 10-12, 14, 15, 17-19, 25, 26, 28, 31-33, 35, 36, 38-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited for disclosing related limitations of the applicant's claimed and disclosed invention. Becker et al, Chu et al, Fuesser et al, Vafai et al, Goodson et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terrell L Mckinnon whose telephone number is 703-305-0059. The examiner can normally be reached on Monday -Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennett can be reached on 308-0101. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Terrell L. McKinnon  
Primary Examiner  
Art Unit 3743  
September 7, 2004